

IV. CHEMICAL RELEASE AND TRANSFER PROFILE

This section is designed to provide background information on the pollutant releases that are reported by this industry. The best source of comparative pollutant release information is the Toxic Release Inventory System (TRI). Pursuant to the Emergency Planning and Community Right-to-Know Act, TRI includes self-reported facility release and transfer data for over 600 toxic chemicals. Facilities within SIC Codes 20-39 (manufacturing industries) that have more than 10 employees, and that are above weight-based reporting thresholds are required to report TRI on-site releases and off-site transfers. The information presented within the sector notebooks is derived from the most recently available (1993) TRI reporting year (which then included 316 chemicals), and focuses primarily on the on-site releases reported by each sector. Because TRI requires consistent reporting regardless of sector, it is an excellent tool for drawing comparisons across industries.

Although this sector notebook does not present historical information regarding TRI chemical releases over time, please note that in general, toxic chemical releases have been declining. In fact, according to the 1993 Toxic Release Inventory Data Book, reported releases dropped by 42.7% between 1988 and 1993. Although on-site releases have decreased, the total amount of reported toxic waste has not declined because the amount of toxic chemicals transferred off-site has increased. Transfers have increased from 3.7 billion pounds in 1991 to 4.7 billion pounds in 1993. Better management practices have led to increases in off-site transfers of toxic chemicals for recycling. More detailed information can be obtained from EPA's annual Toxics Release Inventory Public Data Release book (which is available through the EPCRA Hotline at 1-800-535-0202), or directly from the Toxic Release Inventory System database (for user support call 202-260-1531).

Wherever possible, the sector notebooks present TRI data as the primary indicator of chemical release within each industrial category. TRI data provide the type, amount, and media receptor of each chemical released or transferred. When other sources of pollutant release data have been obtained, these data have been included to augment the TRI information.

TRI Data Limitations

The reader should keep in mind the following limitations regarding TRI data. Within some sectors, the majority of facilities are not subject to TRI reporting because they are not considered manufacturing industries, or because they are below TRI reporting thresholds. Examples are the mining, dry cleaning, printing, and transportation equipment cleaning sectors. For these sectors, release information from other sources has been included.

The reader should also be aware that TRI "pounds released" data presented within the notebooks is not equivalent to a "risk" ranking for each industry. Weighting each pound of release equally does not factor in the relative toxicity of each chemical that is released. The Agency is in the process of developing an approach to assign toxicological weightings to each chemical released so that one can differentiate between pollutants with significant differences in toxicity. As a preliminary indicator of the environmental impact of the industry's most commonly released chemicals, the notebook briefly summarizes the toxicological properties of the top five chemicals (by weight) reported by each industry.

Definitions Associated With Section IV Data Tables

General Definitions

SIC Code -- the Standard Industrial Classification (SIC) is a statistical classification standard used for all establishment-based Federal economic statistics. The SIC codes facilitate comparisons between facility and industry data.

TRI Facilities -- are manufacturing facilities that have 10 or more full-time employees and are above established chemical throughput thresholds. Manufacturing facilities are defined as facilities in Standard Industrial Classification primary codes 20-39. Facilities must submit estimates for all chemicals that are on the EPA's defined list and are above throughput thresholds.

Data Table Column Heading Definitions

The following definitions are based upon standard definitions developed by EPA's Toxic Release Inventory Program. The categories below represent the possible pollutant destinations that can be reported.

RELEASES -- are an on-site discharge of a toxic chemical to the environment. This includes emissions to the air, discharges to bodies of water, releases at the facility to land, as well as contained disposal into underground injection wells.

Releases to Air (Point and Fugitive Air Emissions) -- Include all air emissions from industry activity. Point emissions occur through confined air streams as found in stacks, ducts, or pipes. Fugitive emissions include losses from equipment leaks, or evaporative losses from impoundments, spills, or leaks.

Releases to Water (Surface Water Discharges) - encompass any releases going directly to streams, rivers, lakes, oceans, or other bodies of water. Any estimates for stormwater runoff and non-point losses must also be included.

Releases to Land -- includes disposal of waste to on-site landfills, waste that is

land treated or incorporated into soil, surface impoundments, spills, leaks, or waste piles. These activities must occur within the facility's boundaries for inclusion in this category.

Underground Injection -- is a contained release of a fluid into a subsurface well for the purpose of waste disposal.

TRANSFERS -- is a transfer of toxic chemicals in wastes to a facility that is geographically or physically separate from the facility reporting under TRI. The quantities reported represent a movement of the chemical away from the reporting facility. Except for off-site transfers for disposal, these quantities do not necessarily represent entry of the chemical into the environment.

Transfers to POTWs -- are wastewaters transferred through pipes or sewers to a publicly owned treatment works (POTW). Treatment and chemical removal depend on the chemical's nature and treatment methods used. Chemicals not treated or destroyed by the POTW are generally released to surface waters or landfilled within the sludge.

Transfers to Recycling -- are sent off-site for the purposes of regenerating or recovering still valuable materials. Once these chemicals have been recycled, they may be returned to the originating facility or sold commercially.

Transfers to Energy Recovery -- are wastes combusted off-site in industrial furnaces for energy recovery. Treatment of a chemical by incineration is not considered to be energy recovery.

Transfers to Treatment -- are wastes moved off-site for either neutralization, incineration, biological destruction, or physical separation. In some cases, the chemicals are not destroyed but prepared for further waste management.

Transfers to Disposal -- are wastes taken to another facility for disposal generally as a release to land or as an injection underground.

IV.A. EPA Toxic Release Inventory for the Lumber and Wood Products Industry

TRI Release amounts listed below are not associated with non-compliance with environmental laws. These facilities appear based on self-reported data submitted to the Toxic Release Inventory program.

The TRI database contains a detailed compilation of self-reported, facility-specific chemical releases. The top reporting facilities for this sector are listed below. Facilities that have reported only the SIC codes covered under this notebook appear in Exhibit 15. Exhibit 16 contains additional facilities that have reported

the SIC code covered within this report, and one or more SIC codes that are not within the scope of this notebook. Therefore, Exhibit 16 includes facilities that conduct multiple operations — some that are under the scope of this notebook, and some that are not. Operations in Exhibit 16 include: 2621 - paper mills, 2611 - pulp mills, 2631 - paper mills, and 2812 - industrial inorganic chemicals. Currently, the facility-level data do not allow pollutant releases to be broken apart by industrial process.

Exhibits 17-19 illustrate the TRI releases and transfers for the lumber and wood products industry (SIC 24). For the industry as a whole, VOCs (such as formaldehyde, xylene, toluene, and methanol) comprise the largest number of TRI releases. A large amount of VOC releases, both fugitive and point source emissions, result in part from the extensive use of glues and resins in this industry. VOCs are primarily released during the drying and pressing phases of most wood panel product manufacturing processes. VOC emissions are also associated with solvents used to coat cabinets, decorative panels, and toys.

Exhibit 15
Top 10 TRI Releasing Lumber and Wood Product Facilities (SIC 24 only)

Rank	Total TRI Releases in Pounds	Facility Name	City	State
1	638,622	Merillat Ind. Inc.	Mount Jackson	VA
2	386,994	Component Concepts Inc.	Thomasville	NC
3	383,100	Child Craft Inc. Co. Inc.	Salem	IN
4	341,200	Afco Ind. Inc.	Holland	MI
5	261,000	Decolam Inc.	Orangeburg	SC
6	241,010	Abt Co. Inc.	Roaring River	NC
7	234,697	Weyerhaeuser Particleboard Mill	Adel	GA
8	199,000	J. H. Baxter & Co.	Weed	CA
9	197,800	Georgia-Pacific Corp. Monticello Panelboard	Monticello	GA
10	179,000	Northwood Panelboard Co.	Solway	MN

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Exhibit 16
Top 10 TRI Releasing Lumber and Wood Product Facilities

SIC Codes	Total TRI Releases in Pounds	Facility Name	City	State
2621, 2611, 2812, 2421	1,273,125	Weyerhaeuser Co.	Longview	WA
2621, 2421, 2436	1,187,356	MacMillian Bloedel Inc.	Pine Hill	AL
2611, 2621, 2631, 2421	1,059,615	Potlatch Corp. Pulp & Paperboard Group	Lewiston	ID
2631, 2436, 2499	768,369	Weyerhaeuser Co. Containerboard Packaging Div.	Springfield	OR
2426	638,622	Merillat Ind. Inc.	Mount Jackson	VA
2493	386,994	Component Concepts Inc.	Thomasville	NC
2435	383,100	Child Craft Inc. Co. Inc.	Salem	IN
2493	341,200	AFCO Ind. Inc.	Holland	NH
2439	261,000	Decolam, Inc.	Orangeburg	SC
2493	241,010	Abt Co. Inc.	Roaring River	NC

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Note: Being included on these lists does not mean that the release is associated with non-compliance with environmental laws.

Exhibit 17
TRI Reporting Lumber and Wood Product Facilities (SIC 24) by State

State	Number of Facilities	State	Number of Facilities
AL	43	ND	1
AR	18	NH	1
AZ	2	NJ	4
CA	19	NM	1
CO	3	NV	1
CT	1	NY	6
FL	19	OH	8
GA	35	OK	3
HI	4	OR	24
ID	3	PA	19
IL	9	PR	3
IN	11	RI	1
KY	8	SC	20
LA	17	SD	2
MA	3	TN	12
MD	6	TX	27
ME	4	UT	1
MI	13	VA	24
MN	12	VT	1
MO	6	WA	10
MS	28	WI	18
MT	2	WV	5
NC	31	WY	2

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Exhibit 18
Releases for Lumber and Wood Products (SIC 24) in TRI, by Number of Facilities
(Releases reported in pounds/year)

Chemical Name	#/Facilities Reporting Chemical	Fugitive Air	Point Air	Water Discharges	Under-ground Injection	Land Disposal	Total Releases	Average Releases per Facility
Arsenic Compounds	225	392	387	1661	0	5	2445	11
Chromium Compounds	223	397	392	2043	0	0	2832	13
Copper Compounds	222	397	397	2098	0	5	2897	13
Formaldehyde	69	318332	1832467	3500	0	1333	2155632	31241
Creosote	68	377646	641954	8016	0	943	1028559	15126
Arsenic	66	270	260	1451	0	5	1986	30
Copper	65	265	260	1192	0	250	1967	30
Chromium	63	255	245	1779	0	0	2279	36
Pentachlorophenol	36	5605	4206	2531	0	255	12597	350
Sulfuric Acid	25	10	48151	10	0	0	48171	1927
Ammonia	24	361205	264070	78011	0	7460	710746	29614
Methylenebis (Phenylisocyanate)	24	658	9857	0	0	0	10515	438
Phenol	18	20855	210255	2850	0	5	233965	12998
Methanol	14	130145	554849	0	0	8	685002	48929
Toluene	14	215435	715331	0	0	0	930766	66483
Xylene (Mixed Isomers)	12	52437	1005851	0	0	0	1058288	88191
Acetone	10	205915	180720	0	0	0	386635	38664
Methyl Ethyl Ketone	9	8469	481703	0	0	0	490172	54464
Phosphoric Acid	9	0	20	0	0	0	20	2
Hydrochloric Acid	8	0	0	0	0	0	0	0
Methyl Isobutyl Ketone	8	70864	121782	0	0	0	192646	24081
Zinc Compounds	5	0	0	255	0	5	260	52
Ammonium Sulfate (Solution)	4	0	0	5	0	0	5	1
Glycol Ethers	4	34600	65400	0	0	0	100000	25000
N-Butyl Alcohol	4	3199	89582	0	0	0	92781	23195
Naphthalene	4	10529	4852	0	0	1	15382	3846
Anthracene	3	2000	0	0	0	1	2001	667
Dibenzofuran	3	850	0	0	0	1	851	284
Ethylbenzene	2	1300	64644	0	0	0	65944	32972
Ethylene Glycol	2	1000	52900	0	0	0	53900	26950
Nitric Acid	2	0	1173	0	0	0	1173	587
Quinoline	2	272	0	0	0	1	273	137
Ammonium Nitrate (Solution)	1	0	0	0	0	0	0	0
Antimony Compounds	1	0	0	0	0	0	0	0
Butyl Benzyl Phthalate	1	5	5	0	0	0	10	10
Chlorine	1	5	0	10	0	0	15	15
Di(2-Ethylhexyl) Phthalate	1	0	0	0	0	0	0	0
Dibutyl Phthalate	1	0	0	0	0	0	0	0
Dichloromethane	1	37000		0	0	0	37000	37000
Methyl Methacrylate	1	250	0	0	0	0	250	250
Styrene	1	0	0	0	0	0	0	0
Tetrachloroethylene	1	2	0	0	0	0	2	2

Toluene-2,4-Diisocyanate	1	68	36529	0	0	0	36597	36597
Zinc (Fume Or Dust)	1	5	5	5	0	0	15	15
Totals	491	1,860,637	6,388,247	105,417	0	10,278	8,364,579	17,036

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

Exhibit 19
Transfers for Lumber and Wood Product (SIC 24) in TRI, by Number of Facilities
(Transfers reported in pounds/year)

Chemical Name	# Facilities Reporting Chemical	POTW Discharges	Disposal	Recycling	Treatment	Energy Recovery	Total Transfers	Average Transfers per Facility
Arsenic Compounds	225	0	90677		11192		101869	453
Chromium Compounds	223	0	82702		9494		92446	415
Copper Compounds	222	0	77164		9123		86287	389
Formaldehyde	69	120	1304		750	195	2369	34
Creosote	68	11502	1296906	18667	446558	636818	2410451	35448
Arsenic	66	16	81038		11910		92964	1409
Copper	65	35	54935		8090		63060	970
Chromium	63	7	99933		16200		116390	1847
Pentachlorophenol	36	1125	34860	1010	68963	40981	146939	4082
Sulfuric Acid	25	0					0	0
Ammonia	24	72250	1775				74025	3084
Methylenebis (Phenylisocyanate)	24	600	511		1300		2411	100
Phenol	18	750	15	500	1100		2365	131
Methanol	14	598	2550	4700		5800	13648	975
Toluene	14	0	4300	4800	17700	43400	70200	5014
Xylene (Mixed Isomers)	12	5		16333	1750	78619	96707	8059
Acetone	10	0				9242	9242	924
Methyl Ethyl Ketone	9	0	1700	1800		25990	29490	3277
Phosphoric Acid	9	250					250	28
Hydrochloric Acid	8	0					0	0
Methyl Isobutyl Ketone	8	0				109577	109577	13697
Zinc Compounds	5	0	1505		250		1755	351
Ammonium Sulfate (Solution)	4	0					0	0
Glycol Ethers	4	3060				4500	7560	1890
N-Butyl Alcohol	4	0		750	250	9447	10447	2612
Naphthalene	4	0			751		751	188
Anthracene	3	0			255		255	85
Dibenzofuran	3	0			751		751	250
Ethylbenzene	2	0		1737		3420	5157	2579
Ethylene Glycol	2	0					0	0
Nitric Acid	2	0					0	0
Quinoline	2	0			251		251	126
Ammonium Nitrate (Solution)	1	0					0	0
Antimony Compounds	1	0					0	0
Butyl Benzyl Phthalate	1	0					0	0
Chlorine	1	0					0	0
Di(2-Ethylhexyl) Phthalate	1	0					0	0
Dibutyl Phthalate	1	0					0	0
Dichloromethane	1	0				750	750	750
Methyl Methacrylate	1	300					300	300
Styrene	1	0			250		250	250
Tetrachloroethylene	1	0					0	0
Toluene-2,4-Diisocyanate	1	0					0	0
Zinc (Fume Or Dust)	1	5	5				10	10
Totals	491	90,623	1,831,880	50,297	606,888	968,739	3,548,927	7,228

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

IV.B. Summary of Selected Chemicals Released

The following is a synopsis of current scientific toxicity and fate information for the top chemicals (by weight) that facilities within this sector self-reported as released to the environment based upon 1993 TRI data. Because this section is based upon self-reported release data, it does not attempt to provide information on management practices employed by the sector to reduce the release of these chemicals. Information regarding pollutant release reductions over time may be available from EPA's TRI and 33/50 programs, or directly from the industrial trade associations that are listed in Section IX of this document. Since these descriptions are cursory, please consult the sources referenced below for a more detailed description of both the chemicals described in this section, and the chemicals that appear on the full list of TRI chemicals appearing in Section IV.A.

The brief descriptions provided below were taken from the *1993 Toxics Release Inventory Public Data Release* (EPA, 1994), the Hazardous Substances Data Bank (HSDB), and the Integrated Risk Information System (IRIS), both accessed via TOXNET¹. The information contained below is based upon exposure assumptions that have been conducted using standard scientific procedures. The effects listed below must be taken in context of these exposure assumptions that are more fully explained within the full chemical profiles in HSDB.

The top TRI releases for the lumber and wood products industry (SIC 24) as whole include:

Acetone
Ammonia
Creosote
Formaldehyde
Methanol
Methyl ethyl ketone
Methyl isobutyl ketone
Phenol
Toluene
Xylenes (mixed isomers).

Acetone

Toxicity. Acetone is irritating to the eyes, nose, and throat. Symptoms of exposure to large quantities of acetone may include headache, unsteadiness, confusion, lassitude, drowsiness, vomiting, and respiratory depression.

Reactions of acetone (see environmental fate) in the lower atmosphere contribute to the formation of ground-level ozone. Ozone (a major component of urban smog) can affect the respiratory system, especially in sensitive individuals such as asthmatics or allergy sufferers.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. If released into water, acetone will be degraded by microorganisms or will evaporate into the atmosphere. Degradation by microorganisms will be the primary removal mechanism.

Acetone is highly volatile, and once it reaches the troposphere (lower atmosphere), it will react with other gases, contributing to the formation of ground-level ozone and other air pollutants. EPA is reevaluating acetone's reactivity in the lower atmosphere to determine whether this contribution is significant.

Physical Properties. Acetone is a volatile and flammable organic chemical.

Note: Acetone was removed from the list of TRI chemicals on June 16, 1995 (60 FR 31643) and will not be reported for 1994 or subsequent years.

Ammonia

Toxicity. Anhydrous ammonia is irritating to the skin, eyes, nose, throat, and upper respiratory system.

Ecologically, ammonia is a source of nitrogen (an essential element for aquatic plant growth), and may therefore contribute to eutrophication of standing or slow-moving surface water, particularly in nitrogen-limited waters such as the Chesapeake Bay. In addition, aqueous ammonia is moderately toxic to aquatic organisms.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. Ammonia combines with sulfate ions in the atmosphere and is washed out by rainfall, resulting in rapid return of ammonia to the soil and surface waters.

Ammonia is a central compound in the environmental cycling of nitrogen. Ammonia in lakes, rivers, and streams is converted to nitrate.

Physical Properties. Ammonia is a corrosive and severely irritating gas with a pungent odor.

Formaldehyde

Toxicity. Ingestion of formaldehyde leads to damage to the mucous membranes of mouth, throat, and intestinal tract; severe pain, vomiting, and diarrhea result. Inhalation of low concentrations can lead to irritation of the eyes, nose, and respiratory tract. Inhalation of high concentrations of formaldehyde causes severe damage to the respiratory system and to the heart, and may even lead to death. Other symptoms from exposure to formaldehyde include: headache, weakness, rapid heartbeat, symptoms of shock, gastroenteritis, central nervous system depression, vertigo, stupor, reduced body temperature, and coma. Repeated contact with skin promotes allergic reactions, dermatitis, irritation, and hardening. Contact with eyes causes injuries ranging from minor, transient injury to permanent blindness, depending on the concentration of the formaldehyde solution. In addition, menstrual disorders and secondary sterility have been reported in women exposed to formaldehyde.

Carcinogenicity. Formaldehyde is a probable human carcinogen via both inhalation and oral exposure, based on limited evidence in humans and sufficient evidence in animals.

Environmental Fate. Most formaldehyde is released to the environment as a gas, and is rapidly broken down by sunlight and reactions with atmospheric ions. Its initial oxidation product, formic acid, is a component of acid rain. The rest of the atmospheric formaldehyde is removed via dry deposition, rain or dissolution into surface waters. Biodegradation of formaldehyde in water takes place in a few days. Volatilization of formaldehyde dissolved in water is low. Bioaccumulation of formaldehyde does not occur.

When released onto the soil, aqueous solutions containing formaldehyde will leach through the soil. While formaldehyde is biodegradable under both aerobic and anaerobic conditions, its fate in soil and groundwater is unknown.

Although formaldehyde is found in remote areas, it is probably not transported there, but rather is likely a result of the local generation of formaldehyde from longer-lived precursors which have been transported there.

Methanol

Toxicity. Methanol is readily absorbed from the gastrointestinal tract and the respiratory tract, and is toxic to humans in moderate to high doses. In the body, methanol is converted into formaldehyde and formic acid. Methanol is excreted as formic acid. Observed toxic effects at high dose levels generally include central nervous system damage and blindness. Long-term exposure to high levels of methanol via inhalation cause liver and blood damage in animals.

Ecologically, methanol is expected to have low toxicity to aquatic organisms. Concentrations lethal to half the organisms of a test population are expected to exceed 1 mg methanol per liter water. Methanol is not likely to persist in water or to bioaccumulate in aquatic organisms.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. Liquid methanol is likely to evaporate when left exposed. Methanol reacts in air to produce formaldehyde which contributes to the formation of air pollutants. In the atmosphere it can react with other atmospheric chemicals or be washed out by rain. Methanol is readily degraded by microorganisms in soils and surface waters.

Physical Properties. Methanol is highly flammable.

Methyl Ethyl Ketone

Toxicity. Breathing moderate amounts of methyl ethyl ketone (MEK) for short periods of time can cause adverse effects on the nervous system ranging from

headaches, dizziness, nausea, and numbness in the fingers and toes to unconsciousness. Its vapors are irritating to the skin, eyes, nose, and throat and can damage the eyes. Repeated exposure to moderate to high amounts may cause liver and kidney effects.

Carcinogenicity. No agreement exists over the carcinogenicity of MEK. One source believes MEK is a possible carcinogen in humans based on limited animal evidence. Other sources believe that there is insufficient evidence to make any statements about possible carcinogenicity.

Environmental Fate. Most of the MEK released to the environment will end up in the atmosphere. MEK can contribute to the formation of air pollutants in the lower atmosphere. It can be degraded by microorganisms living in water and soil.

Physical Properties. Methyl ethyl ketone is a flammable liquid.

Toluene

Toxicity. Inhalation or ingestion of toluene can cause headaches, confusion, weakness, and memory loss. Toluene may also affect the way the kidneys and liver function.

Reactions of toluene (see environmental fate) in the atmosphere contribute to the formation of ozone in the lower atmosphere. Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

Some studies have shown that unborn animals were harmed when high levels of toluene were inhaled by their mothers, although the same effects were not seen when the mothers were fed large quantities of toluene. Note that these results may reflect similar difficulties in humans.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. The majority of releases of toluene to land and water will evaporate. Toluene may also be degraded by microorganisms. Once volatilized, toluene in the lower atmosphere will react with other atmospheric components contributing to the formation of ground-level ozone and other air pollutants.

Physical Properties. Toluene is a volatile organic chemical.

Xylene (Mixed Isomers)

Toxicity. Xylenes are rapidly absorbed into the body after inhalation, ingestion,

or skin contact. Short-term exposure of humans to high levels of xylenes can cause irritation of the skin, eyes, nose, and throat, difficulty in breathing, impaired lung function, impaired memory, and possible changes in the liver and kidneys. Both short- and long-term exposure to high concentrations can cause effects such as headaches, dizziness, confusion, and lack of muscle coordination. Reactions of xylenes (see environmental fate) in the atmosphere contribute to the formation of ozone in the lower atmosphere. Ozone can affect the respiratory system, especially in sensitive individuals such as asthma or allergy sufferers.

Carcinogenicity. There is currently no evidence to suggest that this chemical is carcinogenic.

Environmental Fate. The majority of releases to land and water will quickly evaporate, although some degradation by microorganisms will occur.

Xylenes are moderately mobile in soils and may leach into groundwater, where they may persist for several years.

Xylenes are volatile organic chemicals. As such, xylenes in the lower atmosphere will react with other atmospheric components, contributing to the formation of ground-level ozone and other air pollutants.

IV.C. Other Data Sources

The Aerometric Information Retrieval System (AIRS) contains a wide range of information related to stationary sources of air pollution, including the emissions of a number of air pollutants which may be of concern within a particular industry. With the exception of volatile organic compounds (VOCs), there is little overlap with the TRI chemicals reported above. Exhibit 20 summarizes annual releases of carbon monoxide (CO), nitrogen dioxide (NO₂), particulate matter of 10 microns or less (PM₁₀), total particulates (PT), sulfur dioxide (SO₂), and volatile organic compounds (VOCs).

Exhibit 20
Pollutant Releases (Short Tons/Years)

Industry	CO	NO ₂	PM ₁₀	PT	SO ₂	VOC
U.S. Total	97,208,000	23,402,000	45,489,000	7,836,000	21,888,000	23,312,000
Metal Mining	5,391	28,583	39,359	140,052	84,222	1,283
Nonmetal Mining	4,525	28,804	59,305	167,948	24,129	1,736
Lumber and Wood Products	123,756	42,658	14,135	63,761	9,149	41,423
Wood Furniture and Fixtures	2,069	2,981	2,165	3,178	1,606	59,426
Pulp and Paper	624,291	394,448	35,579	113,571	341,002	96,875
Printing	8,463	4,915	399	1,031	1,728	101,537
Inorganic Chemicals	166,147	108,575	4,107	39,082	182,189	52,091
Organic Chemicals	146,947	236,826	26,493	44,860	132,459	201,888
Petroleum Refining	419,311	380,641	18,787	36,877	648,153	309,058
Rubber and Misc. Plastic Products	2,090	11,914	2,407	5,355	29,364	140,741
Stone, Clay, Glass, and Concrete	58,043	338,482	74,623	171,853	339,216	30,262
Iron and Steel	1,518,642	138,985	42,368	83,017	238,268	82,292
Nonferrous Metals	448,758	55,658	20,074	22,490	373,007	27,375
Fabricated Metals	3,851	16,424	1,185	3,136	4,019	102,186
Electronics	367	1,129	207	293	453	4,854
Motor Vehicles, Bodies, Parts, and Accessories	35,303	23,725	2,406	12,853	25,462	101,275
Dry Cleaning	101	179	3	28	152	7,310

Source U.S. EPA Office of Air and Radiation, AIRS Database, May 1995.

IV.D. Comparison of Toxic Release Inventory Between Selected Industries

The following information is presented as a comparison of pollutant release and transfer data across industrial categories. It is provided to give a general sense as to the relative scale of releases and transfers within each sector profiled under this project. Please note that the following table does not contain releases and transfers for industrial categories that are not included in this project, and thus cannot be used to draw conclusions regarding the total release and transfer amounts that are reported to TRI. Similar information is available within the annual TRI Public Data Release book.

Exhibit 21 is a graphical representation of a summary of the 1993 TRI data for the Lumber and Wood Products Industry and the other sectors profiled in separate notebooks. The bar graph presents the total TRI releases and total transfers on the left axis and the triangle points show the average releases per facility on the right axis. Industry sectors are presented in the order of increasing total TRI releases. The graph is based on the data shown in Exhibit 22 and is meant to facilitate comparisons between the relative amounts of releases, transfers, and releases per facility both within and between these sectors. The reader should note, however, that differences in the proportion of facilities captured by TRI exist between industry sectors. This can be a factor of poor SIC matching and relative differences in the number of facilities reporting to TRI from the various sectors. In the case of Lumber and Wood Products Industry, the 1993 TRI data presented here covers 491 facilities. These facilities listed SIC 24 Lumber and Wood Products as a primary SIC code.

Exhibit 21 - Bar Graph

Exhibit 22
Toxic Release Inventory Data for Selected Industries

Industry Sector	SIC Range	# TRI Facilities	Releases		Transfers		Total Releases + Transfers (10 ⁶ pounds)	Average Release+ Transfers per Facility (pounds)
			Total Releases (10 ⁶ pounds)	Average Releases per Facility (pounds)	1993 Total (10 ⁶ pounds)	Average Transfers per Facility (pounds)		
Stone, Clay, and Concrete	32	634	26.6	41,895	2.2	3,500	28.2	46,000
Lumber and Wood Products	24	491	8.4	17,036	3.5	7,228	11.9	24,000
Furniture and Fixtures	25	313	42.2	134,883	4.2	13,455	46.4	148,000
Printing	2711-2789	318	36.5	115,000	10.2	732,000	46.7	147,000
Electronics/Computers	36	406	6.7	16,520	47.1	115,917	53.7	133,000
Rubber and Misc. Plastics	30	1,579	118.4	74,986	45.0	28,537	163.4	104,000
Motor Vehicle, Bodies, Parts and Accessories	371	609	79.3	130,158	145.5	238,938	224.8	369,000
Pulp and paper	2611-2631	309	169.7	549,000	48.4	157,080	218.1	706,000
Inorganic Chem. Mfg.	2812-2819	555	179.6	324,000	70.0	126,000	249.7	450,000
Petroleum Refining	2911	156	64.3	412,000	417.5	2,676,000	481.9	3,088,000
Fabricated Metals	34	2,363	72.0	30,476	195.7	82,802	267.7	123,000
Iron and Steel	3312-3313 3321-3325	381	85.8	225,000	609.5	1,600,000	695.3	1,825,000
Nonferrous Metals	333, 334	208	182.5	877,269	98.2	472,335	280.7	1,349,000
Organic Chemical Mfg.	2861-2869	417	151.6	364,000	286.7	688,000	438.4	1,052,000
Metal Mining	10	Industry sector not subject to TRI reporting						
Nonmetal Mining	14	Industry sector not subject to TRI reporting						
Dry Cleaning	7215, 7216, 7218	Industry sector not subject to TRI reporting						

Source: U.S. EPA, Toxics Release Inventory Database, 1993.

V. POLLUTION PREVENTION OPPORTUNITIES

The best way to reduce pollution is to prevent it in the first place. Some companies have creatively implemented pollution prevention techniques that improve efficiency and increase profits while at the same time minimizing environmental impacts. This can be done in many ways such as reducing material inputs, re-engineering processes to reuse by-products, improving management practices, and employing substitution of toxic chemicals. Some smaller facilities are able to actually get below regulatory thresholds just by reducing pollutant releases through aggressive pollution prevention policies.

In order to encourage these approaches, this section provides both general and company-specific descriptions of some pollution prevention advances that have been implemented within the lumber and wood products industry. While the list is not exhaustive, it does provide core information that can be used as the starting point for facilities interested in beginning their own pollution prevention projects. When possible, this section provides information from real activities that can, or are being implemented by this sector -- including a discussion of associated costs, time frames, and expected rates of return. This section provides summary information from activities that may be, or are being implemented by this sector. When possible, information is provided that gives the context in which the techniques can be effectively used. Please note that the activities described in this section do not necessarily apply to all facilities that fall within this sector. Facility-specific conditions must be carefully considered when pollution prevention options are evaluated, and the full impacts of the change must examine how each option affects, air, land, and water pollutant releases.

Surface Protection

Several alternative manufacturing methods are part of the industry's pollution prevention efforts. One common alternative is to replace chemical treatment with another type of treatment to achieve surface protection. For example, the need for surface treatment would be decreased if efforts were made to dry the wood to reduce water content (high water content leads to sapstain). Due to economies of scale, this option may not be economically viable for a smaller mill.

Another pollution prevention option is the use of high velocity spray systems that generate fewer process residuals and less drippage. However, a small production volume may not favor this option since spray systems require a larger flow of wood through the systems to be economically or technically feasible.

Other pollution prevention strategies relating to surface protection include: 1) local and general ventilation within the cutting process area to reduce dust which would accumulate on wood; 2) blowing wood with air to further reduce sawdust on wood prior to surface protection; and 3) the use of drainage collection devices

on roof tops to keep rainwater away from process wastes. For wastes that cannot be reduced at the source, generators may consider used surface protectant recycling as the next best option.

Panel Products

Air emissions from panel manufacturing are significantly greater than releases to water or land. The following information on pollution prevention options for the wood panel products industry (including veneer/plywood and reconstituted wood products) is from Martin and Norheim's summary.

Alternative Fiber Sources

One pollution prevention opportunity for the reconstituted wood panel industry is to search for alternative sources of wood fiber. This can be done in two ways: utilizing recycled wood waste and using existing agricultural fibers.

Increasing prices for raw wood furnish have led some firms to develop programs to recycle wood waste into chips for PB production. These firms collect construction site debris, discarded household items, crates, and used pallets for eventual use as PB furnish. Beyond finding sources, an ideal fiber recycling program includes extensive training and research on what materials are suitable, careful quality control of the recycled materials, and cleaning materials to remove foreign matter. There are many hurdles to properly cleaning the material because it is difficult to process different kinds of material and maintain a quality product.

A second alternative source for fiber is agricultural fiber, which can come from two sources: agricultural crops grown expressly for fiber (e.g., kenaf and bagasse) and residues of crops grown for other purposes (e.g., corn stalks/cobs and cotton stalks). Currently, two plants are being built in the U.S. that will use agricultural fiber to manufacture composite panels. In terms of potential availability, the amount of residual fiber generated by U.S. agriculture far exceeds present and future fiber requirements for composite panel manufacture. The feasibility of such a substitution, however, depends on many factors such as product quality, cost, and current uses of agriculture residues.

Alternative Adhesives

Other pollution prevention options in the panel products industry involve adhesive substitution. This involves replacing existing adhesives with less toxic formulations. There are a number of innovative adhesive options currently available for use in the panel products industry.

MDI Substitution

Based on price alone, there seems to be little incentive for manufacturers to switch from PF or UF to MDI adhesives. However, since the early 80's, one third of the OSB industry has switched from PF to MDI adhesives. According to their manufacturers, there are several environmental advantages to using these adhesives. Because MDI adhesives are capable of bonding wood flakes with a higher moisture content, less dryer energy is required to dry flakes suitable for MDI bonding. Other advantages to using MDI adhesives are lower press temperatures and shorter press cycles, both of which may lead to reduced press emissions. However, there are other concerns with respect to the use of MDI adhesives. Some companies are opposed to MDI substitution for reasons such as worker toxics exposure, potential acute impacts of possible spills, and inconsistency with toxic use reduction objectives. Manufacturers of MDI state that safe exposure levels are obtainable through good engineering controls which include making sure that blenders are well sealed, and that the blending and forming areas are well ventilated.

High Moisture Adhesives

Switching to an adhesive that is capable of bonding a high moisture furnish eliminates the need to dry wood to a low moisture content. Dryer energy and temperature can be reduced because less water must be removed from the wood. Press temperature can also be lowered since heat transfer is more efficient in high moisture furnish, reducing VOC emissions.

The gluing of high moisture content wood has become an established practice in plywood manufacture. Many OSB plants are switching to high moisture bonding adhesives with the primary goals of reducing dryer emissions and possibly reducing wood drying costs. Efforts have been made to improve phenolic resin technology to allow better bonding in the presence of water. The primary incentive for bonding high moisture veneer is a reduction in adhesive consumption. In the Southern plywood industry; where dryout is a problem, a dramatic reduction in adhesive use has been achieved by gluing high moisture veneer.

Naturally-derived Adhesives

Spurred by rapid price increases of petroleum-derived chemicals in adhesives such as PF and UF, chemical material suppliers, forest products companies, and wood adhesive/binder suppliers are expending research and development funds to search for renewable raw material sources. Substitutes could replace entirely, or at least partially, petroleum-derived chemicals now used in the manufacture of wood adhesives. Naturally-derived adhesives are included in this profile as a pollution prevention opportunity because of the potential to use renewable resources, which in many cases are by-products of other processes.

Furfuryl Alcohol Resins

Resins manufactured from furfuryl alcohol are being evaluated as an alternative low-VOC binder to substitute for PF resins. Unlike PF resins, furfuryl alcohol resins are stored stable at ambient temperatures, without refrigeration. As delivered, furfuryl alcohol resin contains very low amounts of volatile components. Upon curing, it reduces 80 to 90 percent of total VOC emissions, and reduces Hazardous Air Pollutants (HAPs) by the same amount. The furfuryl alcohol system offers the same relative speed of cure as the PF resin systems.

Furfuryl alcohol resin is currently in the experimental stage of development. The industry has shown little interest in the resin because of its high cost; which is twice that of a PF resin. However, cost analyses performed for the insulation industry show that using the resin to meet future HAP standards is cheaper than purchasing and operating control devices such as scrubbers. The same is likely true for the wood products industry.

Lignin Adhesives

Lignin is an aromatic polymer that makes up one of the three major components of wood (cellulose and hemicellulose are the others). The abundance of lignin as a waste product in pulp mills has made it a desirable raw material alternative to nonrenewable petroleum-derived chemicals in the production of wood adhesives.

Until recently, no more than 20 to 30 percent of lignin could be substituted into PF resins because cure times increased as the amount of lignin increased. Another drawback is that lignin adhesives have low cross-linking and strength. However, a new approach has recently been developed that can substitute large amounts of kraft lignin for PF adhesives while actually increasing cure speed and board strength.

Currently, Westvaco is the only company in the U.S. that operates a commercial lignin extraction facility. The capital cost of a new commercial lignin extraction facility compared to the capital cost of a new phenol plant is estimated to be almost equal per pound of product produced. However, because the selling price of lignin is only \$0.32-0.34, compared to the selling price of phenol which is \$.45/solid pound and rising, there is more of an economic incentive to build a new phenol plant than a lignin extraction facility.

Polyvinyl acetate (PVA)

There have been some mill trials and some small quantities of hardwood plywood made with cross-linked polyvinyl acetate (PVA) adhesives. Blends of PVA and UF are also sometimes used in the manufacture of hardwood plywood. Cross-linked PVAs are light in color, are compatible with the hardwood plywood

manufacturing process, and don't require additional equipment. Concerns have been expressed about the potential of airborne release of vinyl monomers. PVA adhesives are considerably higher in cost than UF adhesives.

Alternative Manufacturing Processes

Veneer and Plywood Adhesive Reduction

In the softwood plywood industry, a common waste generated by the typical spray-line layup system is over-spray. A more efficient way of applying adhesive to veneer is by foam extrusion, a process in which foamed adhesive is forced under pressure to the extrusion head. This process better concentrates the glue stream onto the veneer, resulting in less wasted adhesive and less chance of adhesive dryout before pressing. In terms of economics, the combination of less waste and lower spread rates when using foam extruders can add up to savings in the 20 to 31 percent range, depending on the type of equipment used.

Another pollution prevention option in the softwood plywood industry is the variable application rate strategy (VARS). The amount of adhesive required to bond veneer varies with moisture content. For example, high moisture veneer requires less glue than low moisture veneer because there is less migration of water from the glue into the veneer. Although the moisture content of veneer varies at a typical plywood mill, glue is applied at a constant rate to prevent dryout of low moisture veneer. A 1992 study by Faust and Borders outlined in Forest Products Journal, investigated the use of the glue application rate with respect to improved bond quality and reduced resin consumption. The variable application rate strategy (VARS) they developed adjusted the glue spread rate for each individual plywood panel according to its moisture content. Process-sensing and control technology has been developed for the practical application of VARS. Sensor technology is currently available for on-line adjustment and measurement of veneer moisture content and temperature. In addition to compensating for problem bonding conditions that occur unexpectedly during production, the greatest benefit of VARS from a pollution prevention standpoint is a reduction in adhesive consumption and, consequently a reduction in plant emissions.

Alternative Dryers

There are other process modifications that may be implemented to reduce emissions while drying green furnish for reconstituted wood panel manufacture. Researchers are currently investigating the use of alternative drying methods for raw wood furnish.

Rotary drum dryers are used in the OSB industry. These are typically characterized by high-temperature drying air, aggressive handling of strands, and short product-retention times. The adverse affects of these characteristics include

VOC emissions and strand degradation. Research has shown that low-temperature drying reduces VOC emissions. However, this requires that the furnish be retained in the dryer for a longer period of time which is difficult to achieve in a rotary dryer. It has been found that conveyor belt dryers generate less VOC emissions than rotary dryers. Temperatures of less than 400°F and very low volumes of exhaust gases are possible with conveyor dryers, resulting in low emission levels of VOC, while virtually eliminating strand damage within the dryer. Conveyor dryers can also be used to dry PB furnish.

The three pass high velocity (3PHV) rotary drum dryer is a major breakthrough in rotary drum drying technology that has the potential to reduce VOC emissions significantly (see Exhibit 9). The 3PHV is a rotating cylindrical drum consisting of three, concentric, interlocking cylinders. Hot gases enter the outermost cylinder with the wood chips and progress through the intermediate and then the inner drum shells in a serpentine flow path. This flow path direction is the opposite of that in the conventional three-pass dryer. This reverse air flow may reduce VOC emissions.

In the first pass, the 3PHV dryer allows smaller, dried particles to pass through the slower moving mass of larger, wetter particles in an area bounded by the outer and intermediate drum cylinders. This area is much larger than the area of the inner drum of conventional triple pass dryers. As the larger particles are dried, they will "catch up" with the smaller faster moving particles in an area bounded by the intermediate (second pass) drum cylinder. Here, airflow velocities become high enough to convey the entire mass of particles out of the drying portion of the drum and into the inner (third pass) drum cylinder where they will be conveyed out of the dryer. This action prevents the product from reaching temperatures in excess of the wet bulb temperature, thus reducing carbon monoxide and hydrocarbon emissions associated with pyrolysis and combustion of the wood chips.

Wood Preserving

Water-borne preservatives produce less waste than oil-borne preservatives because process wastewater is reused rather than discharged. In addition, well designed treatment plants, good treatment practices, effective housekeeping, and employee training also help reduce waste at the source.

Well designed treatment plants may have enclosed treatment buildings, covered drip pads with liners, automatic lumber handling systems, centralized tank farms with spill containment, and air ventilation systems. The RCRA standards in 40 CFR 264 and 265 require that drip pads must contain drippage, be free of cracks and gaps, and be cleaned and inspected. Plants can also be designed to minimize mist or droplet emissions from cylinders and work tanks through the use of air exchange systems and cylinder and tank venting.

Treatment practices are also important for preventing pollution. Ensuring that wood stock is clean prior to treatment will prevent dirt, sawdust, and other debris from accumulating in the treatment system. To prevent debris buildup, wood can be covered during shipment and/or power-washed when necessary before it enters the treatment plant. Strip pumps may be installed to continuously return residual chemical solutions to the work tank, resulting in less dripping when the cylinder doors are opened. If treating cylinders are tilted slightly away from the drip pad, there is also less spillage when opening the cylinder doors.

Housekeeping is an integral part of waste minimization efforts. All tanks, mixing systems, treating cylinders, drip pads, and spill containments should be inspected regularly for leaks. Drip pads and collection areas should be kept clean. Storage yards should be inspected daily, and any drippage detected should be cleaned up within 24 hours.

Several other preservatives have been proposed as alternatives to traditional preservatives. For example, wood can be treated with borates using both pressure and non-pressure processes. However, because they are highly susceptible to leaching, borates cannot be used to preserve wood that will be in contact with the ground or exposed to the weather (e.g., decking).

Ammoniacal copper/quarternary ammonium (ACQ) is another proposed alternative. Initial above-ground field test data show that ACQ is effective for softwood and hardwood protection. Other alternative preservatives may include copper-8-quinolinolate (Cu₈), copper naphthanate, zinc naphthanate, quarternary NH₄ compounds (QAC), and zinc sulfate.

Treatment processes may vary in their ability to minimize waste. For example, the empty-cell process uses less carrier oil than the full-cell process for oil-borne preservatives. The modified full-cell treatment reduces the uptake of treating solution and minimizes the amount of dripping for water-borne preservatives.

Pollution Prevention Case Studies

Reconstituted Wood Products

By late 1995, CanFibre hopes to start up its first plant to produce MDF using 100 percent post-consumer waste and PF adhesives. The plant (the first of its kind in North America) will be located near Toronto, Ontario. Approximately 1.2 million ft³ per year of structural MDF will be produced from recycled urban waste such as waste wood, cardboard, drink containers, newspaper, etc. The plant will have two significant cost advantages over conventional MDF plants: (1) the costs of post-consumer waste is currently negative, and (2) savings in freight costs due to the plant's location near an urban site (most existing MDF plants are remotely located and the cost of hauling wood waste back to these mills is high). The net mill cost for the process used by the firm's Toronto plant is estimated to be \$183/million square feet (MSF) versus \$228/MSF for a conventional plant. The company plans to build a total of nine plants in North America: six in the U.S. and three in Canada. All plants will use 100 percent post-consumer waste and PF adhesives.

Wood Preserving

Perry Builders, Inc. employs 20 people at its Henderson pressure wood preserving manufacturing facility. Perry Builders recognizes that each wood treater has an important responsibility in properly handling and disposing of the wastes it produces and is committed to meeting this challenge. Perry uses a water-borne chemical preservative; chromated copper arsenate, to treat lumber, plywood, timbers, and other wood products for decks, fences, and other outdoor uses. Hazardous waste results from contact of sawdust, wood chips, and dirt with the preservative. It has successfully minimized its hazardous waste generation by 80

percent in two years with the implementation of a low-cost waste minimization program. In 1987, Perry Builders generated 15 drums of hazardous waste with a disposal cost of \$2,380. By 1989 Perry Builders reduced its disposal cost to \$310 by generating only two drums.

This reduction was achieved by changing both equipment and processes to achieve a fully integrated closed system in which the application, receipt, transfer, and storage of the preservative takes place in a contained area.

The goal is to apply the preservative to the wood while minimizing the loss of the preservative as a waste. By holding the lumber in the treatment chamber longer to allow drippage, and by using a vacuum pump to further dry the lumber, the treatment solution remains in the chamber and does not come into contact with scrap material and dirt. As an incentive to employees to assure adequate drying time, management instituted pay based on hourly wages rather than an amount of lumber treated. A roof over the area housing the treated lumber prevents runoff during rainfall.

Perry Builders estimates that the cost of the vacuum pump, the roof, and the increased drying time will be recovered in five years through reduced disposal costs. There is also another economic benefit—since the drier lumber weighs less, more footage of lumber can be shipped on each truck, thereby reducing freight costs.

VI. SUMMARY OF FEDERAL STATUTES AND REGULATIONS

This section discusses the Federal statutes and regulations that may apply to this sector. The purpose of this section is to highlight, and briefly describe the applicable Federal requirements, and to provide citations for more detailed information. The three following sections are included.

- Section VI.A contains a general overview of major statutes
- Section VI.B contains a list of regulations specific to this industry
- Section VI.C contains a list of pending and proposed regulations

The descriptions within Section VI are intended solely for general information. Depending upon the nature or scope of the activities at a particular facility, these summaries may or may not necessarily describe all applicable environmental requirements. Moreover, they do not constitute formal interpretations or clarifications of the statutes and regulations. For further information, readers should consult the Code of Federal Regulations and other state or local regulatory agencies. EPA Hotline contacts are also provided for each major statute.

VI.A. General Description of Major Statutes

Resource Conservation And Recovery Act

The Resource Conservation And Recovery Act (RCRA) of 1976 which amended the Solid Waste Disposal Act, addresses solid (Subtitle D) and hazardous (Subtitle C) waste management activities. The Hazardous and Solid Waste Amendments (HSWA) of 1984 strengthened RCRA's waste management provisions and added Subtitle I, which governs underground storage tanks (USTs).

Regulations promulgated pursuant to Subtitle C of RCRA (40 CFR Parts 260-299) establish a "cradle-to-grave" system governing hazardous waste from the point of generation to disposal. RCRA hazardous wastes include the specific materials listed in the regulations (commercial chemical products, designated with the code "P" or "U"; hazardous wastes from specific industries/sources, designated with the code "K"; or hazardous wastes from non-specific sources, designated with the code "F") or materials which exhibit a hazardous waste characteristic (ignitability, corrosivity, reactivity, or toxicity and designated with the code "D").

Regulated entities that generate hazardous waste are subject to waste accumulation, manifesting, and recordkeeping standards. Facilities that treat, store, or dispose of hazardous waste must obtain a permit, either from EPA or from a State agency which EPA has authorized to implement the permitting program. Subtitle C permits contain general facility standards such as contingency plans, emergency

procedures, recordkeeping and reporting requirements, financial assurance mechanisms, and unit-specific standards. RCRA also contains provisions (40 CFR Part 264 Subpart S and §264.10) for conducting corrective actions which govern the cleanup of releases of hazardous waste or constituents from solid waste management units at RCRA-regulated facilities.

Although RCRA is a Federal statute, many States implement the RCRA program. Currently, EPA has delegated its authority to implement various provisions of RCRA to 46 of the 50 States.

Most RCRA requirements are not industry specific but apply to any company that transports, treats, stores, or disposes of hazardous waste. Here are some important RCRA regulatory requirements:

- **Identification of Solid and Hazardous Wastes** (40 CFR Part 261) lays out the procedure every generator should follow to determine whether the material created is considered a hazardous waste, solid waste, or is exempted from regulation.
- **Standards for Generators of Hazardous Waste** (40 CFR Part 262) establishes the responsibilities of hazardous waste generators including obtaining an ID number, preparing a manifest, ensuring proper packaging and labeling, meeting standards for waste accumulation units, and recordkeeping and reporting requirements. Generators can accumulate hazardous waste for up to 90 days (or 180 days depending on the amount of waste generated) without obtaining a permit.
- **Land Disposal Restrictions (LDRs)** are regulations prohibiting the disposal of hazardous waste on land without prior treatment. Under the LDRs (40 CFR 268), materials must meet land disposal restriction (LDR) treatment standards prior to placement in a RCRA land disposal unit (landfill, land treatment unit, waste pile, or surface impoundment). Wastes subject to the LDRs include solvents, electroplating wastes, heavy metals, and acids. Generators of waste subject to the LDRs must provide notification of such to the designated TSD facility to ensure proper treatment prior to disposal.

- **Used Oil Management Standards** (40 CFR Part 279) impose management requirements affecting the storage, transportation, burning, processing, and re-refining of the used oil. For parties that merely generate used oil, regulations establish storage standards. For a party considered a used oil marketer (one who generates and sells off-specification used oil directly to a used oil burner), additional tracking and paperwork requirements must be satisfied.
- **Tanks and Containers** used to store hazardous waste with a high volatile organic concentration must meet emission standards under RCRA. Regulations (40 CFR Part 264-265, Subpart CC) require generators to test the waste to determine the concentration of the waste, to satisfy tank and container emissions standards, and to inspect and monitor regulated units. These regulations apply to all facilities who store such waste, including generators operating under the 90-day accumulation rule.
- **Underground Storage Tanks** (USTs) containing petroleum and hazardous substance are regulated under Subtitle I of RCRA. Subtitle I regulations (40 CFR Part 280) contain tank design and release detection requirements, as well as financial responsibility and corrective action standards for USTs. The UST program also establishes increasingly stringent standards, including upgrade requirements for existing tanks, that must be met by 1998.
- **Boilers and Industrial Furnaces** (BIFs) that use or burn fuel containing hazardous waste must comply with strict design and operating standards. BIF regulations (40 CFR Part 266, Subpart H) address unit design, provide performance standards, require emissions monitoring, and restrict the type of waste that may be burned.

EPA's RCRA/Superfund/UST Hotline, at (800) 424-9346, responds to questions and distributes guidance regarding all RCRA regulations. The RCRA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., EST, excluding Federal holidays.

Comprehensive Environmental Response, Compensation, And Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a 1980 law commonly known as Superfund, authorizes EPA to respond to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment. CERCLA also enables EPA to force parties responsible for environmental contamination to clean it up or to reimburse the Superfund for response costs incurred by EPA. The Superfund Amendments and Reauthorization Act (SARA) of 1986 revised various sections of CERCLA, extended the taxing authority for the Superfund, and created a free-standing law, SARA Title III, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA).

The CERCLA **hazardous substance release reporting regulations** (40 CFR Part 302) direct the person in charge of a facility to report to the National Response Center (NRC) any environmental release of a hazardous substance which exceeds a reportable quantity. Reportable quantities are defined and listed in 40 CFR § 302.4. A release report may trigger a response by EPA, or by one or more Federal or State emergency response authorities.

EPA implements **hazardous substance responses** according to procedures outlined in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300). The NCP includes provisions for permanent cleanups, known as remedial actions, and other cleanups referred to as "removals." EPA generally takes remedial actions only at sites on the National Priorities List (NPL), which currently includes approximately 1300 sites. Both EPA and states can act at other sites; however, EPA provides responsible parties the opportunity to conduct removal and remedial actions and encourages community involvement throughout the Superfund response process.

EPA's RCRA/Superfund/UST Hotline, at (800) 424-9346, answers questions and references guidance pertaining to the Superfund program. The CERCLA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., EST, excluding Federal holidays.

Emergency Planning And Community Right-To-Know Act

The Superfund Amendments and Reauthorization Act (SARA) of 1986 created the Emergency Planning and Community Right-to-Know Act (EPCRA, also known as SARA Title III), a statute designed to improve community access to information about chemical hazards and to facilitate the development of chemical emergency response plans by State and local governments. EPCRA required the establishment of State emergency response commissions (SERCs), responsible for coordinating certain emergency response activities and for appointing local emergency planning committees (LEPCs).

EPCRA and the EPCRA regulations (40 CFR Parts 350-372) establish four types of reporting obligations for facilities which store or manage specified chemicals:

- **EPCRA §302** requires facilities to notify the SERC and LEPC of the presence of any "extremely hazardous substance" (the list of such substances is in 40 CFR Part 355, Appendices A and B) if it has such substance in excess of the substance's threshold planning quantity, and directs the facility to appoint an emergency response coordinator.
- **EPCRA §304** requires the facility to notify the SERC and the LEPC in the event of a release exceeding the reportable quantity of a CERCLA hazardous substance or an EPCRA extremely hazardous substance.
- **EPCRA §§311 and 312** require a facility at which a hazardous chemical, as defined by the Occupational Safety and Health Act, is

present in an amount exceeding a specified threshold to submit to the SERC, LEPC, and local fire department material safety data sheets (MSDSs) or lists of MSDSs and hazardous chemical inventory forms (also known as Tier I and II forms). This information helps the local government respond in the event of a spill or release of the chemical.

- **EPCRA §313** requires manufacturing facilities included in SIC codes 20 through 39, which have ten or more employees, and which manufacture, process, or use specified chemicals in amounts greater than threshold quantities, to submit an annual toxic chemical release report. This report, commonly known as the Form R, covers releases and transfers of toxic chemicals to various facilities and environmental media, and allows EPA to compile the national Toxic Release Inventory (TRI) database.

All information submitted pursuant to EPCRA regulations is publicly accessible, unless protected by a trade secret claim.

EPA's EPCRA Hotline, at (800) 535-0202, answers questions and distributes guidance regarding the emergency planning and community right-to-know regulations. The EPCRA Hotline operates weekdays from 8:30 a.m. to 7:30 p.m., EST, excluding Federal holidays.

Clean Water Act

The primary objective of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), is to restore and maintain the chemical, physical, and biological integrity of the nation's surface waters. Pollutants regulated under the CWA include "priority" pollutants, including various toxic pollutants; "conventional" pollutants, such as biochemical oxygen demand (BOD), total suspended solids (TSS), fecal coliform, oil and grease, and pH; and "non-conventional" pollutants, including any pollutant not identified as either conventional or priority.

The CWA regulates both direct and indirect discharges. The **National Pollutant Discharge Elimination System (NPDES)** program (CWA §402) controls direct discharges into navigable waters. Direct discharges or "point source" discharges are from sources such as pipes and sewers. NPDES permits, issued by either EPA or an authorized State (EPA has presently authorized forty States to administer the NPDES program), contain industry-specific, technology-based and/or water quality-based limits, and establish pollutant monitoring and reporting requirements. A facility that intends to discharge into the nation's waters must obtain a permit prior to initiating its discharge. A permit applicant must provide quantitative analytical data identifying the types of pollutants present in the facility's effluent. The permit will then set forth the conditions and effluent limitations under which a facility may make a discharge.

A NPDES permit may also include discharge limits based on Federal or State water quality criteria or standards, that were designed to protect designated uses of surface waters, such as supporting aquatic life or recreation. These standards, unlike the technological standards, generally do not take into account technological feasibility or costs. Water quality criteria and standards vary from State to State, and site to site, depending on the use classification of the receiving body of water. Most States follow EPA guidelines which propose aquatic life and human health criteria for many of the 126 priority pollutants.

Storm Water Discharges

In 1987 the CWA was amended to require EPA to establish a program to address **storm water discharges**. In response, EPA promulgated the NPDES storm water permit application regulations. Storm water discharge associated with industrial activity means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant (40 CFR 122.26(b)(14)). These regulations require that facilities with the following storm water discharges apply for a NPDES permit: (1) a discharge associated with industrial activity; (2) a discharge from a large or medium municipal storm sewer system; or (3) a discharge which EPA or the State determines to contribute to a violation of a water quality standard or is a significant contributor of pollutants to waters of the United States.

The term "storm water discharge associated with industrial activity" means a storm water discharge from one of 11 categories of industrial activity defined at 40 CFR 122.26. Six of the categories are defined by SIC codes while the other five are identified through narrative descriptions of the regulated industrial activity. If the primary SIC code of the facility is one of those identified in the regulations, the facility is subject to the storm water permit application requirements. If any activity at a facility is covered by one of the five narrative categories, storm water discharges from those areas where the activities occur are subject to storm water discharge permit application requirements.

Those facilities/activities that are subject to storm water discharge permit application requirements are identified below. To determine whether a particular facility falls within one of these categories, the regulation should be consulted.

Category i: Facilities subject to storm water effluent guidelines, new source performance standards, or toxic pollutant effluent standards.

Category ii: Facilities classified as SIC 24-lumber and wood products (except wood kitchen cabinets); SIC 26-paper and allied products (except paperboard containers and products); SIC 28-chemicals and allied products (except drugs and paints); SIC 29-petroleum refining; and SIC 311-leather tanning and finishing.

Category iii: Facilities classified as SIC 10-metal mining; SIC 12-coal mining; SIC 13-oil and gas extraction; and SIC 14-nonmetallic mineral mining.

Category iv: Hazardous waste treatment, storage, or disposal facilities.

Category v: Landfills, land application sites, and open dumps that receive or have received industrial wastes.

Category vi: Facilities classified as SIC 5015-used motor vehicle parts; and SIC 5093-automotive scrap and waste material recycling facilities.

Category vii: Steam electric power generating facilities.

Category viii: Facilities classified as SIC 40-railroad transportation; SIC 41-local passenger transportation; SIC 42-trucking and warehousing (except public warehousing and storage); SIC 43-U.S. Postal Service; SIC 44-water transportation; SIC 45-transportation by air; and SIC 5171-petroleum bulk storage stations and terminals.

Category ix: Sewage treatment works.

Category x: Construction activities except operations that result in the disturbance of less than five acres of total land area.

Category xi: Facilities classified as SIC 20-food and kindred products; SIC 21-tobacco products; SIC 22-textile mill products; SIC 23-apparel related products; SIC 2434-wood kitchen cabinets manufacturing; SIC 25-furniture and fixtures; SIC 265-paperboard containers and boxes; SIC 267-converted paper and paperboard products; SIC 27-printing, publishing, and allied industries; SIC 283-drugs; SIC 285-paints, varnishes, lacquer, enamels, and allied products; SIC 30-rubber and plastics; SIC 31-leather and leather products (except leather and tanning and finishing); SIC 323-glass products; SIC 34-fabricated metal products (except fabricated structural metal); SIC 35-industrial and commercial machinery and computer equipment; SIC 36-electronic and other electrical equipment and components; SIC 37-transportation equipment (except ship and boat building and repairing); SIC 38-measuring, analyzing, and controlling instruments; SIC 39-miscellaneous manufacturing industries; and SIC 4221-4225-public warehousing and storage.

Pretreatment Program

Another type of discharge that is regulated by the CWA is one that goes to a publicly-owned treatment works (POTWs). The national **pretreatment program** (CWA §307(b)) controls the indirect discharge of pollutants to POTWs by

"industrial users." Facilities regulated under §307(b) must meet certain pretreatment standards. The goal of the pretreatment program is to protect municipal wastewater treatment plants from damage that may occur when hazardous, toxic, or other wastes are discharged into a sewer system and to protect the quality of sludge generated by these plants. Discharges to a POTW are regulated primarily by the POTW itself, rather than the State or EPA.

EPA has developed technology-based standards for industrial users of POTWs. Different standards apply to existing and new sources within each category. "Categorical" pretreatment standards applicable to an industry on a nationwide basis are developed by EPA. In addition, another kind of pretreatment standard, "local limits," are developed by the POTW in order to assist the POTW in achieving the effluent limitations in its NPDES permit.

Regardless of whether a State is authorized to implement either the NPDES or the pretreatment program, if it develops its own program, it may enforce requirements more stringent than Federal standards.

EPA's Office of Water, at (202) 260-5700, will direct callers with questions about the CWA to the appropriate EPA office. EPA also maintains a bibliographic database of Office of Water publications which can be accessed through the Ground Water and Drinking Water resource center, at (202) 260-7786.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) mandates that EPA establish regulations to protect human health from contaminants in drinking water. The law authorizes EPA to develop national drinking water standards and to create a joint Federal-State system to ensure compliance with these standards. The SDWA also directs EPA to protect underground sources of drinking water through the control of underground injection of liquid wastes.

EPA has developed primary and secondary drinking water standards under its SDWA authority. EPA and authorized States enforce the primary drinking water standards, which are, contaminant-specific concentration limits that apply to certain public drinking water supplies. Primary drinking water standards consist of maximum contaminant level goals (MCLGs), which are non-enforceable health-based goals, and maximum contaminant levels (MCLs), which are enforceable limits set as close to MCLGs as possible, considering cost and feasibility of attainment.

The SDWA **Underground Injection Control (UIC)** program (40 CFR Parts 144-148) is a permit program which protects underground sources of drinking water by regulating five classes of injection wells. UIC permits include design, operating, inspection, and monitoring requirements. Wells used to inject

hazardous wastes must also comply with RCRA corrective action standards in order to be granted a RCRA permit, and must meet applicable RCRA land disposal restrictions standards. The UIC permit program is primarily State-enforced, since EPA has authorized all but a few States to administer the program.

The SDWA also provides for a Federally-implemented Sole Source Aquifer program, which prohibits Federal funds from being expended on projects that may contaminate the sole or principal source of drinking water for a given area, and for a State-implemented Wellhead Protection program, designed to protect drinking water wells and drinking water recharge areas.

EPA's Safe Drinking Water Hotline, at (800) 426-4791, answers questions and distributes guidance pertaining to SDWA standards. The Hotline operates from 9:00 a.m. through 5:30 p.m., EST, excluding Federal holidays.

Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) granted EPA authority to create a regulatory framework to collect data on chemicals in order to evaluate, assess, mitigate, and control risks which may be posed by their manufacture, processing, and use. TSCA provides a variety of control methods to prevent chemicals from posing unreasonable risk.

TSCA standards may apply at any point during a chemical's life cycle. Under TSCA §5, EPA has established an inventory of chemical substances. If a chemical is not already on the inventory, and has not been excluded by TSCA, a premanufacture notice (PMN) must be submitted to EPA prior to manufacture or import. The PMN must identify the chemical and provide available information on health and environmental effects. If available data are not sufficient to evaluate the chemical's effects, EPA can impose restrictions pending the development of information on its health and environmental effects. EPA can also restrict significant new uses of chemicals based upon factors such as the projected volume and use of the chemical.

Under TSCA §6, EPA can ban the manufacture or distribution in commerce, limit the use, require labeling, or place other restrictions on chemicals that pose unreasonable risks. Among the chemicals EPA regulates under §6 authority are asbestos, chlorofluorocarbons (CFCs), and polychlorinated biphenyls (PCBs).

EPA's TSCA Assistance Information Service, at (202) 554-1404, answers questions and distributes guidance pertaining to Toxic Substances Control Act standards. The Service operates from 8:30 a.m. through 4:30 p.m., EST, excluding Federal holidays.

Clean Air Act

The Clean Air Act (CAA) and its amendments, including the Clean Air Act Amendments (CAAA) of 1990, are designed to “protect and enhance the nation's air resources so as to promote the public health and welfare and the productive capacity of the population.” The CAA consists of six sections, known as Titles, which direct EPA to establish national standards for ambient air quality and for EPA and the States to implement, maintain, and enforce these standards through a variety of mechanisms. Under the CAAA, many facilities will be required to obtain permits for the first time. State and local governments oversee, manage, and enforce many of the requirements of the CAAA. CAA regulations appear at 40 CFR Parts 50-99.

Pursuant to Title I of the CAA, EPA has established national ambient air quality standards (NAAQSs) to limit levels of "criteria pollutants," including carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur dioxide. Geographic areas that meet NAAQSs for a given pollutant are classified as attainment areas; those that do not meet NAAQSs are classified as non-attainment areas. Under §110 of the CAA, each State must develop a State Implementation Plan (SIP) to identify sources of air pollution and to determine what reductions are required to meet Federal air quality standards.

Title I also authorizes EPA to establish New Source Performance Standards (NSPSs), which are nationally uniform emission standards for new stationary sources falling within particular industrial categories. NSPSs are based on the pollution control technology available to that category of industrial source but allow the affected industries the flexibility to devise a cost-effective means of reducing emissions.

Under Title I, EPA establishes and enforces National Emission Standards for Hazardous Air Pollutants (NESHAPs), nationally uniform standards oriented towards controlling particular hazardous air pollutants (HAPs). Title III of the CAAA further directed EPA to develop a list of sources that emit any of 189 HAPs, and to develop regulations for these categories of sources. To date EPA has listed 174 categories and developed a schedule for the establishment of emission standards. The emission standards will be developed for both new and existing sources based on "maximum achievable control technology" (MACT). The MACT is defined as the control technology achieving the maximum degree of reduction in the emission of the HAPs, taking into account cost and other factors.

Title II of the CAA pertains to mobile sources, such as cars, trucks, buses, and planes. Reformulated gasoline, automobile pollution control devices, and vapor recovery nozzles on gas pumps are a few of the mechanisms EPA uses to regulate mobile air emission sources.

Title IV establishes a sulfur dioxide emissions program designed to reduce the

formation of acid rain. Reduction of sulfur dioxide releases will be obtained by granting to certain sources limited emissions allowances, which, beginning in 1995, will be set below previous levels of sulfur dioxide releases.

Title V of the CAAA of 1990 created a permit program for all "major sources" (and certain other sources) regulated under the CAA. One purpose of the operating permit is to include in a single document all air emissions requirements that apply to a given facility. States are developing the permit programs in accordance with guidance and regulations from EPA. Once a State program is approved by EPA, permits will be issued and monitored by that State.

Title VI is intended to protect stratospheric ozone by phasing out the manufacture of ozone-depleting chemicals and restrict their use and distribution. Production of Class I substances, including 15 kinds of chlorofluorocarbons (CFCs), will be phased out entirely by the year 2000, while certain hydrochlorofluorocarbons (HCFCs) will be phased out by 2030.

EPA's Control Technology Center, at (919) 541-0800, provides general assistance and information on CAA standards. The Stratospheric Ozone Information Hotline, at (800) 296-1996, provides general information about regulations promulgated under Title VI of the CAA, and EPA's EPCRA Hotline, at (800) 535-0202, answers questions about accidental release prevention under CAA §112(r). In addition, the Technology Transfer Network Bulletin Board System (modem access (919) 541-5742)) includes recent CAA rules, EPA guidance documents, and updates of EPA activities.

VI.B. Industry Specific Requirements

Clean Air Act (CAA)

Under the Clean Air Act, PM₁₀, (particulate matter with an aerodynamic diameter of 10 microns or less) and volatile organic compounds (VOCs) are regulated to ensure attainment with the National Ambient Air Quality Standards for PM₁₀ and ground level ozone (VOCs contribute to the formation of ground level ozone). Wood products have the potential to emit PM₁₀ and VOCs in significant quantities.

As required by §110 of the CAA, State Implementation Plans (SIPs) must be developed to identify sources of air pollution and determine what reductions are required to meet Federal standards. An important compliance component of these SIPs are generic opacity limits, which dictate that no stack shall have emissions above a certain percent opacity. Within the wood products industry, these regulations apply to hog fuel boilers and veneer dryers. The standard limit for emissions of all kinds is 20 percent opacity, meaning that only 80 percent of light

is able to pass through the plume. However, some States provide exceptions to the opacity limits for certain industries or manufacturing processes depending on the state's SIP.

Also written into each SIP are provisions that require all new stationary sources constructed in a National Ambient Air Quality Standards (NAAQ) attainment area and that have the potential to emit above a specified tonnage per year to install best available control technology (BACT). In addition, these facilities need to obtain a Prevention of Significant Deterioration (PSD) permit (40 CFR 52.21).

Standards of Performance for Fossil Fuel Fired Steam Generating Units (40 CFR 60.40, subpart D), apply to any fossil fuel-fired and wood residue fired steam generating unit that commences construction modification or reconstruction after August 17, 1971, and that has a heat input capacity derived from fossil fuels of greater than 73 megawatts (250 mm BTU/hr). Unlike subparts Db and Dc, descriptions of which follow, the contribution of heat from wood fuels is not considered in determining the heat input capacity since it is not a fossil fuel. The regulation addresses emission standards, compliance and performance test methods, monitoring requirements (including continuous opacity monitoring systems), and reporting requirements for particulate matter, nitrogen oxides, and sulfur dioxide.

Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units (40 CFR 60.40b, subpart Db), apply to any steam generating unit that commences construction, modification, or reconstruction after June 19, 1984 and that has a heat input (heat derived from combustion of fuel only, not exhaust gases, etc.) capacity of at least 29 MW. This includes steam generating units that use wood as a source of fuel. The regulation addresses emission standards, compliance and performance test methods, monitoring requirements, and reporting requirements for particulate matter, nitrogen oxides, and sulfur dioxide. Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR 60.40c, Subpart Dc), apply to any small steam generating unit (2.9 MW to 29 MW) that commences construction, modification, or reconstruction, after June 9, 1989. The regulation addresses requirements for particulate matter and sulfur dioxide emissions.

In addition to applying to steam generating units in general (including wood-fueled plants), the subparts make several specific references to wood-fueled plants. With regard to small units, the regulation provides:

- A formula for allowable sulfur dioxide emissions (based on the amount of fuel used) that excludes wood from the calculation of fuel used
- Particulate matter standards for facilities that combust wood
- Opacity standards for facilities that combust wood
- Nitrogen oxide standards for facilities that combust combinations of wood and other fuels
- Compliance procedures for facilities that combust combinations of wood and other fuels.

Clean Water Act (CWA)

Facilities in the lumber and wood products industry that discharge treated wastewaters from point sources to surface waters of the U.S. must obtain a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES permit program is authorized by Section 402 of the CWA and is implemented through 40 CFR Parts 122 through 124. Other parts of the CFR affecting the NPDES program include Part 125 (technology-based standards), Part 129 (toxic pollutant standards), and Part 130 (water quality-based standards). Discharges to publicly-owned treatment works (POTWs) are subject to the pretreatment standards in 40 CFR Part 403.

Technology-based permit limits are derived from effluent limitation guidelines and standards (ELG); 40 CFR Part 429 for this industry. These limitations incorporate both technology-based and water quality-based limits, depending on which is more protective. Effluent guidelines subdivide the industry based on the following production operations:

- Veneer
- Plywood
- Dry process hardboard
- Wet process hardboard
- Wood preserving—water-borne or nonpressure
- Wood preserving—steam
- Wood preserving—Boulton.

The guidelines set limitations for the pollutants of concern (i.e., BOD₅, TSS, pH, COD, phenols, and oil and grease for those facilities in the wood preserving

subcategory).

Resource Conservation and Recovery Act (RCRA)

Wood Preserving Final Rule

EPA amended regulations under RCRA (57 Federal Register 61502, December 30, 1992) by listing as hazardous three categories of wastes generated by wood preserving operations that use chlorophenolic, creosote, and/or inorganic (arsenical and chromium) preservatives.

The listed wastes include wastewaters, process residuals, preservative drippage, and spent preservatives from wood preserving processes at facilities that use or have previously used chlorophenolic formulations, facilities that use creosote formulations, and facilities that use inorganic preservatives containing arsenic or chromium.

Specifically, the following RCRA-regulated hazardous wastes are related to wood preserving operations:

- K001 (bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote or PCP),
- F032 (wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations),
- F034 (wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations), and
- F035 (wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium).

The rule includes permitting and interim status standards for the drip pads used to assist in the collection of treated wood drippage. These standards include requirements for drip pad design, operation, inspection, and closure.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), of 1947 (7 U.S.C. 136) requires registration of pesticides to protect consumers from mislabeled, defective, and ineffective pesticides and to identify products that might be harmful to public health or the environment even when used properly. FIFRA has been amended several times: in 1972, 1975, 1978, 1980, 1988, and 1991. The primary purpose of the 1972 amendments was to ensure that pesticide use would be subject to a thorough review of environmental and human health hazards. The 1988 amendments established schedules and duties for re-registration of pesticides.

Under FIFRA, a registered pesticide must be used in a manner consistent with its label. A registered pesticide may be used in a manner inconsistent with its label in the following situations, unless specifically prohibited by the label:

- Applying a pesticide at a dosage, concentration, or frequency less than that specified on the label
- Applying a pesticide against a pest not specified on the label if the application is to a crop, animal, or site that is specified on the label
- Employing a method of application not specifically prohibited by the label
- Mixing a pesticide with a fertilizer
- Applying a pesticide in conformance with an experimental use permit, or a specific exemption of a Federal or State agency
- Applying a pesticide in a manner that the Administrator determines is consistent with the purposes of FIFRA.

Use of a registered pesticide in a manner inconsistent with its label is unlawful in all other situations.

In addition, the Administrator has the authority to classify pesticides as being for general use or for restricted use only. Pesticides classified as for restricted use only include creosote, pentachlorophenol, and inorganic salts such as chromated copper arsenate, all of which are used in wood-preserving solutions. Such pesticides must be applied only by a certified applicator or under the direct supervision of a certified applicator (section 136j(a)(1)(F)). Standards for certification are established by the Federal government or by State governments with Federal approval.

In a notice published in the Federal Register on January 10, 1986 (Vol. 51, No. 7, January 10, 1986, p. 1334-1348), the EPA established several conditions for registering creosote, pentachlorophenol, and inorganic arsenicals for use in wood preserving, to ensure that such use would not endanger human health standards. EPA and the wood preserving industry agreed that the industry would establish a voluntary Consumer Awareness Program to educate consumers in the proper use of and precautionary practices regarding wood treated with creosote, pentachlorophenol, and inorganic arsenicals, to ensure that such uses would not endanger health standards. Through the program, information about treated wood is disseminated in an information sheet provided to end-users at the time of sale or delivery. An earlier Federal Register notice of July 13, 1984 established terms of registration under which the wood preserving industry agreed to establish air monitoring systems at facilities using formulations containing arsenic.

VI.C. Pending and Proposed Regulatory Requirements

RCRA

As part of EPA's groundwater protection strategy, RCRA prohibits the land disposal of most hazardous wastes until they meet a waste specific treatment standard. While most hazardous wastes have already been assigned treatment standards, EPA must still promulgate two additional rule makings to address newly listed wastes and to make changes to the land disposal restrictions (LDR) program.

When finalized, the Phase III LDR rulemaking will establish treatment standards for some newly listed wastes and will mandate RCRA equivalent treatment be performed upon certain characteristically hazardous wastes that are injected into UIC wells under the Safe Drinking Water Act (SDWA) or managed in Subtitle D surface impoundments prior to discharge pursuant to the Clean Water Act (CWA). By consent decree, EPA must promulgate the final rule for Phase III by January 1996.

Phase IV will similarly restrict other newly listed or identified wastes from land disposal and create influent treatment standards to mitigate the impact of sludges, leaks, and air emissions from surface impoundments that manage decharacterized wastes. Of particular significance to wood preserving industries, Phase IV will restrict the land disposal of F032, F034, and F035. Once the prohibitions for these wastes become effective, they will need to meet numeric treatment levels for specific hazardous constituents commonly found in F032, F034, and F035. Phase IV will also restrict the land disposal of the previously exempt Bevill wastes and adjust the treatment standards applicable to wastes that exhibit the toxicity characteristic for a metal

constituent. Subject to the same consent decree, Phase IV has been assigned a final judicial deadline of June 1996.

Clean Air Act

Many of the chemicals used for wood preserving are listed as hazardous air pollutants (HAPs) in Section 112 of the Clean Air Act Amendments of 1990. Treatment processes have been identified as potentially significant sources of these HAPs and, as such, are source categories for which national emission standards may be necessary.

Three emissions standards based on "maximum achievable control technology" (MACT) will be developed for products covered by SIC 24: a wood treatment MACT standard is due by November 15, 1997; a plywood/PB manufacturing MACT standard is due by November 15, 2000; and a flat wood paneling (surface coating) MACT standard is due by November 15, 2000. The MACT is defined as the control technology achieving the maximum degree of reduction in the emission of the HAPs, taking into account cost and other factors.